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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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David Qiang Meng

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05/15/2006

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EXAMINER

TRUJILLO, JAMES K

ART UNIT

PAPER NUMBER

2116

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/678,576	Applicant(s) MENG ET AL.	
	Examiner James K. Trujillo	Art Unit 2116	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/03/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) ☐ Notice of Informal Patent Application (PTO-152) |
| 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

DETAILED ACTION

1. The office acknowledges the receipt of the following and placed of record in the file:
Submission of Application dated 10/03/03.
2. Claims 1-27 are presented for examination.

Claim Objections

3. Claims 15 and 21-27 are objected to because of the following informalities:
 - a. Regarding claim 15, "program" on line 2 should be changed to "computer program product", to prevent lack of-antecedent basis.
 - b. Regarding claims 21-27, on line 1 of each of the claims "forwarding" should be precede device, in order to prevent indefiniteness. Specifically, device by itself does not specifically point out and distinctly claim whether the device is the "forwarding device", the "PHY device" or the "MAC device."

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 1-6, 8-11, 14-23 and 25-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al., U.S. Patent 6,546,496.
6. Regarding claim 1, Wang teaches a network processor, the network processor comprising:
 - a. at least one interface to at least one device carrying network traffic (PCI Bus control 24 and PCI Slave 37, figure 1);
 - b. a set of processing engines (download engine 23 and upload engine 25, figure 1); and
 - c. circuitry to control power consumed by individual ones of the set of processing engines (PCI and XMIT Clock Control 35 and RCV Clock Control 36, figure 1) based on network traffic handled by the network processor (clocks are distributed in response to monitoring of bus and network activity, col. 4, lines 7-14).
7. Regarding claim 2, Wang taught the network processor according to claim 1, as described above. Wang further teaches wherein the circuitry comprises multiple power control lines, an individual one of the power control lines to control power consumption of at least one of the processing engines (each processor engine of Wang has its own power control line, figure 1).
8. Regarding claim 3, Wang taught the network processor according to claim 2, as described above. Wang further teaches wherein the individual power control line controls power consumption of only one of the processing engines (each processor engine of Wang has its own power control line, figure 1).

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9. Regarding claim 4, Wang taught the network processor according to claim 2, as described above. Wang further teaches wherein the circuitry comprises at least one logic gate coupled to the clock input of a one of the processing engines, the at least one logic gate operating on a one of the power control lines and a clock signal (col. 1, lines 45-50 and col. 4, lines 7-14).

10. Regarding claim 5, Wang taught the network processor according to claim 1, as described above. Wang further teaches wherein the circuitry comprises circuitry to access network traffic meter data (in order to distribute the clocks in response to the monitoring of bus and network data it is inherent that the circuitry accesses network traffic meter data, col. 4, lines 12-14).

11. Regarding claim 6, Wang taught the network processor according to claim 4, as described above. Wang further teaches wherein the circuitry comprises circuitry to meter network traffic in individual traffic flows (monitoring takes place for the transmitting and the receiving separately, figure 1).

12. Regarding claim 8, Wang taught the network processor according to claim 1, as described above. Therefore he also teaches wherein the circuitry comprises computer program instructions, disposed on a computer readable medium, the instructions for causing at least one of the processing engines to determine engine(s) to power down based on the metering (col. 4, lines 7-14).

13. Regarding claims 9, 10, 14-19 Wang taught the claimed network processor, therefore he also teaches the claimed method and the claimed computer program product.

14. Regarding claim 11, Wang taught the network processor according to claim 1, as described above. Wang further teaches wherein controlling power consumption comprises

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AND-ing the signal sent over the individual power control line with a clock signal (col. 4, lines 8-20).

15. Regarding claim 20, Wang teaches a network forwarding device, the device comprising:
 - a. at least one physical layer (PHY) device (PHY INTFC 21, figure 1, and PHY 107, figures 2, 7 and 9);
 - b. at least one media access control (MAC) device communicatively coupled to at least one of the at least one PHY devices (MAC XMIT 20X and MAC RCV 20R, figure 1; MAC transmitter 113 and MAC receiver 110, figure 2; MAC transmitter 252, figure 7 and MAC receiver 282, figure 9);
 - c. at least one network processor communicatively coupled to the at least one MAC device, the network processor comprising:
 - i. a set of processing engines (download engine 23 and upload engine 25, figure 1); and
 - ii. circuitry to control power consumption of individual ones of the set of processing engines (PCI and XMIT Clock Control 35 and RCV Clock Control 36, figure 1) based on network traffic handled by the network processor (clocks are distributed in response to monitoring of bus and network activity, col. 4, lines 7-14).
16. Regarding claims 21-23 and 25-26, Wang taught the claimed network processor, therefore he also teaches the claimed device.

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17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 7, 12, 13 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salapura et al., U.S. Patent 6,904 in view of Wang et al., U.S. Patent 6,546,496.

19. Regarding claim 7, Salapura teaches a network processor, the network processor comprising:

- a. at least one interface to at least one device carrying network traffic (input port module 12, figure 2);
- b. a set of processing engines (CPU 20, figure 2);
- c. at least one shared memory controller communicatively coupled to the processing engines (DMA controller 14, figure 2); and
- d. wherein the processing engines comprise multi-threaded processing engines (the system and method supports multi-threading and/ multiprocessor computation, col. 1, lines 64-67).

Salapura does not explicitly disclose circuitry to control power consumed by individual ones of the set of processing engines based on network traffic handled by the network processor.

Wang teaches circuitry to control power consumed by individual ones of the set of processing engines (PCI and XMIT Clock Control 35 and RCV Clock Control 36, figure 1) based on network traffic handled by the network processor (clocks are distributed in response to

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monitoring of bus and network activity, col. 4, lines 7-14). Wang like Salapura also teaches at least one interface to at least one device carrying network traffic (PCI Bus control 24 and PCI Slave 37, figure 1); and a set of processing engines (download engine 23 and upload engine 25, figure 1). Wang is in the same field of endeavor as Salapura in that both are directed toward processing packets. Wang further provides the advantage of minimizing power consumption for network devices (col. 10, lines 15-25).

It would have been obvious to one of ordinary skill in the art, having the teachings of Salapura and Wang before them at the time the invention was made, to modify the network processor of Salapura to include the circuitry to control power as taught by Wang to control power to the set of processing engines of Salapura.

One of ordinary skill in the art would have been motivated to make this modification in order to minimize the power consumption of the network processor of Salapura, in view of the teachings of Wang.

20. Regarding claim 12, Salapura teaches a method wherein processing engines comprise at least one engine to perform packet classification (abstract).

Salapura does not explicitly disclose wherein controlling power consumption comprises sending signals over power control lines, an individual one of the power control lines being associated with a particular processing engine.

Wang teaches a method of controlling power consumption comprises sending signals over power control lines, an individual one of the power control lines being associated with a particular processing engine. Wang is in the same field of endeavor as Salapura in that both are

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directed toward processing packets. Wang further provides the advantage of minimizing power consumption for network devices (col. 10, lines 15-25).

It would have been obvious to one of ordinary skill in the art, having the teachings of Salapura and Wang before them at the time the invention was made, to modify the network processor of Salapura to include the circuitry to control power as taught by Wang to control power to the set of processing engines of Salapura.

One of ordinary skill in the art would have been motivated to make this modification in order to minimize the power consumption of the network processor of Salapura, in view of the teachings of Wang.

21. Regarding claim 13, Salapura together with Wang claimed network processor therefore together they also teach the claimed method.

22. Regarding claim 24, Wang taught the forwarding device according to claim 20, as described above. Salapura together with Wang taught the claimed network processor therefore together they also teach the claimed forwarding device.

23. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheng et al., U.S. Patent Application Publication 2004/0095934 in view of Wang et al., U.S. Patent 6,546,496.

24. Regarding claim 27, Cheng teaches a network forwarding device having network processor(s) that comprise a line card (104, figure 1); wherein the device comprises multiple line cards (more than one 104, figure 1); and further comprising a switch fabric interconnecting the multiple line cards (switching fabric 110).

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Cheng does explicitly disclose where the network forwarding device, the device comprising: at least one physical layer (PHY) device; at least one media access control (MAC) device communicatively coupled to at least one of the at least one PHY devices; at least one network processor communicatively coupled to the at least one MAC device, the network processor comprising: a set of processing engines; and circuitry to control power consumption of individual ones of the set of processing engines based on network traffic handled by the network processor and wherein the PHY(s), MAC(s) comprise a line card.

Wang teaches a network forwarding device comprising:

at least one physical layer (PHY) device (PHY INTFC 21, figure 1, and PHY 107, figures 2, 7 and 9);

at least one media access control (MAC) device communicatively coupled to at least one of the at least one PHY devices;

at least one network processor communicatively coupled to the at least one MAC device (MAC XMIT 20X and MAC RCV 20R, figure 1; MAC transmitter 113 and MAC receiver 110, figure 2; MAC transmitter 252, figure 7 and MAC receiver 282, figure 9), the network processor comprising:

a set of processing engines (download engine 23 and upload engine 25, figure 1); and

circuitry to control power consumption of individual ones of the set of processing engines (PCI and XMIT Clock Control 35 and RCV Clock Control 36, figure 1) based on network traffic handled by the network processor (clocks are distributed in response to monitoring of bus and network activity, col. 4, lines 7-14) and wherein the PHY(s), MAC(s) comprise a line card (the PHY(s) and MAC(s) are part of a network interface card).

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Wang is in the same field of endeavor as Cheng in that both are directed toward processing packets. Wang further provides the advantage of minimizing power consumption for network devices (col. 10, lines 15-25).

It would have been obvious to one of ordinary skill in the art, having the teachings of Cheng and Wang before them at the time the invention was made, to modify the network processor of forward device of Cheng to include the circuitry to control power as taught by Wang to at least control power to the set of processing engines of Cheng.

One of ordinary skill in the art would have been motivated to make this modification in order to minimize the power consumption of the network processor of Cheng, in view of the teachings of Wang.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 6,795,450 to Mills teaches a method and apparatus of connecting a network interface card to a switch fabric.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James K. Trujillo whose telephone number is (571) 272-3677.

The examiner can normally be reached on M-F (8:00 am - 5:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Browne can be reached on (571) 272-3670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "James K. Trujillo", with the date "5/9/06" written below it.

James K. Trujillo
Patent Examiner
Technology Center 2100